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HE-45B
6MTR KUIR

LAFAYETTE

6 METER AMATEUR BAND TRANSCEIVER

MODEL HE-45B

OPERATING AND INSTALLATION INSTRUCTIONS

SPECIFICATIONS

RECEIVER

Superheterodyne receiver covering the entire 6 meter (50 to 54 Mc) amateur radio service. Built-in noise limiter control with improved full wave automatic and adjustable noise limiter and full AVC. Illuminated channel tuning dial with planetary vernier tuning. An "S" meter calibrated in S units allows measurements of incoming signal strength. The meter is wired with a switch to enable monitoring of final transmitter amplifier wattage.

SENSITIVITY: 1 microvolt.
SELECTIVITY: 3 KC at 6db down.
IMAGE REJECTION: 45 db.
I.F. FREQUENCY: 1650 KC.
NOISE GATE LIMITER: Adjustable type.
AUDIO OUTPUT: 3 Watt, 3½ Alnico V Speaker.

TRANSMITTER

POWER: Power input of 15 watts to the final Straight-through class C 2E26 RF amplifier.
FREQUENCY: 3 switch selected transmit positions. Supplied with crystal for one frequency. Widely tuned for full efficiency on the entire 6 meter band.
MICROPHONE: Hand held ceramic microphone with push to talk switch; Position one—microphone in receive position; Position two—microphone in push to talk position. Spring release switch.
ANTENNA MATCHING: 30 to 100 ohms.

CONTROLS

RF PEAKING CONTROL
VOLUME ON-OFF
PLANETARY TUNING
NOISE LIMITER CONTROL Adjustable type including stand-by switch.
CRYSTAL SELECTOR: 2 crystal controlled fixed transmitting frequencies plus a position for an external V.F.O.
RF METER INDICATOR: 2 position switch controlled. Position "PRF" — reads antenna feed voltage. Position "S" indicates received signal strength. Zero adjustment provided.
SPOT SWITCH: Crystal calibrator to check calibration of receivers frequency dial.

Operates on 117 VAC and 12 volts DC, with proper supplied cables. Battery operated cable internally fused.

INPUT RATING 117 Volts AC 60 cycles
80 Watts Receive
100 Watts Transmit
12.6 Volts D.C.
6.5 Amps Transmit
5 Amps Receive
SIZE: 5½" H x 12½" W x 8" D.
TANK CONTROL: Tank condenser to adjust the transmitter for maximum output.
ANTENNA TUNE CONTROL: Used for loading the transmitter into the antenna.

The Lafayette Model HE-45B transceiver is a combination transmitter and receiver designed for use in the 6 meter (50.1 to 54 Mc) amateur radio service. Designed to meet the Federal Communications Commission (FCC) requirements, the unit will provide economical and reliable radio communication in its intended application if installed and operated in accordance with instructions contained herein.

The transmitter may be operated on any frequency in the 6 meter amateur phone band (50.1 to 54 Mc). Provision has been made for front panel insertion of 2 crystals into the unit, any one of which may be selected by means of a 3 position selector switch. Crystals covering any frequency within the 6 meter amateur band can very easily be inserted into the unit. A-VFO may be inserted into a socket on the front panel, selected by the selector switch. Crystal controlled and plate modulated, the transmitter delivers a power input of 15 Watts to the final RF amplifier.

The receiver utilizes a sensitive superheterodyne circuit with 3 I.F. dual tuned transformers and incorporates a built-in noise limiter circuit with full wave automatic series noise limiting and full AVC. An adjustable tuned RF Bandpass stage precedes the detector for added sensitivity and selectivity, and to keep RF radiation to a minimum. The receiver tunes the entire 6 meter band. The receiver also incorporates an "S" meter for recording the signal strength of the desired signal. A spotting switch is incorporated which permits the operator to set the receivers tuning dial to the exact frequency upon which you are transmitting. A variable "Pi" network is incorporated that permits matching to any type of antenna.

POWER SUPPLIES

The HE-45B may be operated from a 117 volt 60 cycle AC source or from a 12 volt DC battery source.

117V 60 Cycle AC Source: An AC line cord, terminated at one end with a normal AC plug and at the other with an 8-pin socket, is supplied with the Transceiver. The 8-pin socket should be connected to the matching plug on the transceiver before inserting the AC plug into the wall outlet.

12V DC Source: The battery cable supplied is terminated at one end with a 8-pin socket and at the other end with an external in-line fuse holder terminating into a cigarette lighter plug. The 8-pin socket should be connected to the matching plug on the transceiver. It does not matter which polarity of the battery is grounded since inserting the other end of the cable into the lighter receptacle automatically connects the cable to the "Hot" (Ungrounded) terminal of the battery.

ANTENNA INSTALLATION

The most important single factor determining optimum transmission is the antenna. The antenna chosen should be selected for each transceiver on the basis of the application involved.

FIXED ANTENNA INSTALLATION

For short range communication, an inexpensive base load type of antenna or spiral whip antenna will be adequate. An antenna of the "ground plane" type will provide greater, more reliable coverage. Both of these types are essentially non-directional and are ideal for applications involving fixed-to-mobile operation.

The directional "beam" type of antenna with ant. rotator may be used to extend the range of the Transceiver and will provide reliable communication over an unusually long range or under adverse weather conditions. Because of their directional properties these antennas are ideal for point-to-point communication, that is, from fixed station to another. A good 4 or 5 element beam is recommended.

The range of the transceiver also has a direct bearing on the height of the antenna used: Regardless of the type chosen, always locate the antenna as high as possible. It is important therefore, to choose a location for the transceiver that is favorable to your antenna location. A long lead-in cable will introduce a certain amount of power loss and should be avoided where possible unless the antenna location justifies its use. Up to 25 feet of cable lead-in may be used if it permits a favorable antenna location.

Wherever possible, use a good water pipe ground. In most cases this will provide greatly improved operation.

MOBILE ANTENNA INSTALLATION

The type of antenna best suited for mobile service is a vertically polarized whip antenna. In any mobile installation (Cars, trucks, boats, etc.), an antenna system that is non-directional has to be used. Other factors likely to offset performance are lack of a good earth ground and ignition interference. However, the base-load type whip antenna will normally provide good results for short-range communications. Greater range and more reliable operation can be obtained with a full quarter-wave vertical whip antenna. Both of these types of antennas use the metal body of the vehicle as a "ground plane". If the transceiver is not mounted to any metal surface, it will be necessary to run a separate ground wire from the unit to a good metal ground in the vehicle. If installed in a boat the transceiver will not operate at maximum efficiency without a ground plate, unless your vessel has a steel hull. However, before installing the transceiver, consult a qualified marine technician regarding an adequate grounding system. The new type hi-gain horizontally polarized Halo antenna for 6 meters or a coaxial antenna is also recommended for mobile operation.

ANTENNA CONNECTIONS

The antenna lead-in cable, RG-58/U, should be terminated with a UHF type PL-259 connector. The receptacle, SO-239, located on the transceiver accepts this type of connector.

The LAFAYETTE Model HE-748WX Halo type antenna or the cowl mount universal 6 Meter Mobile antenna, Model HE-801WX may be connected directly to the transceiver.

IGNITION INTERFERENCE

Engine ignition interference in a car or truck should not present a serious problem. The suppression carried out on vehicles equipped with a standard broadcast radio will normally suffice. However, if an ignition interference problem is present, any skilled auto radio repairman should be able to correct it for you.

Electrical noise from engines and other electrical equipment aboard a boat or vessel can render your transceiver useless. The worst offender will be the ignition system of gasoline engine pow-

ered boats. Generators on both gasoline and diesel engines, auxiliary generators, electric motors on refrigerators, bilge pumps, fans, etc., must be filtered for quiet radio reception.

Unfortunately, there is no hard and fast rule for the elimination of noise. It is best to attack the problem systematically. The ignition system can be filtered by the use of a "spark shield" made to fit most common gasoline marine engines. These shields are easily installed and can be removed for spark plug and point servicing in less than a minute.

Auxiliary generators are quieted down by condenser installations. Condensers of the highest quality, in metal cans, should be used. We recommend that a capacity of 1.0 mfd be used. These are of greater capacity than the condensers normally used in automobile radio installations. The same condensers can be used to filter the other motors. Condensers are installed at the generator armature terminal or, in extreme cases, directly on each brush holder. The metal can is connected to the generator frame. Never connect a condenser to the field terminal of a generator.

The voltage regulator on the larger generators is frequently a source of troublesome noise. Before attempting any filtering on the regulator, have the unit cleaned and adjusted by an expert. If noise is still present, install condensers on the armature terminal of the regulator. Again, do not put a condenser on the field terminal.

Another, more infrequent source of noise is caused by the rotation of the propeller shaft in its various bearings. This rotation causes static electricity discharge. If noise is present when the vessel or boat is underway but goes away when you throw the engine out of gear, you most probably have "shaft noise". This noise can usually be eliminated by installing phosphor bronze "fingers" in such a way as to allow wiping contact with the shaft. The finger is then connected to the engine block with a heavy wire.

Diesel engines have no ignition system and therefore need no shields. The generators must be filtered just as they are for gasoline engines.

Other electrical accessories such as fans, bilge pumps, electric toilets, fresh water system motors, etc., are also a possible source of noise. These units can be noise suppressed by means of condensers.

MOBILE INSTALLATION OF TRANSCEIVER

Before installing the transceiver in a car, truck, boat, etc., be sure to choose a location which is convenient to the operating controls, and will not interfere with the normal functions of the driver. The transceiver may be mounted to the underside of the instrument panel or dashboard of a car, truck, etc., by means of the carrying handle, that is supplied with the transceiver. Remove the two rubber bumpers from the handle to provide mounting holes. Two self threading screws are provided for this. If additional back support is required, provision has been made for the use of a perforated steel strap. Cut and bend the perforated strap to the desired shape, attaching one end to the firewall and the other end to the self threading screw projecting from chassis rear. The 12V D.C. power input cable is terminated with a plug which may be inserted directly into the cigarette lighter socket on a car or truck. A 10 Amp fuse is incorporated as part of this cable. In a more permanent installation the plug should be removed and the cable connected to the main battery source. A convenient place to make this connection would be the ignition switch. In this manner the power input to the transceiver would be controlled by the position of the ignition key. This will prevent unauthorized persons from using the transceiver and also prevent the transceiver from being left on. It is imperative that the "hot" or center lead of this plug is connected to the ignition switch. If this wire is reversed, the fuse in the vehicle will blow.

MAXIMUM POWER TRANSFER TO ANTENNA

With antenna disconnected, insert the recommended dummy antenna, see sketch, into the antenna receptacle. Set transceiver to the transmitting position. Set METER switch to the PRF position. With a combination coil slug alignment tool adjust antenna TUNE condenser (C2), see license label for location,

fully tight then back out a $\frac{1}{2}$ turn. Adjust antenna tank condenser (C1) for max. reading of the PRF meter or maximum brilliance of the lamp. Re-adjust C2 condenser for max reading on the "PRF" meter. Then re-adjust C1 condenser for maximum lamp brilliance or max reading of meter.

T.V. INTERFERENCE TRAP

This transceiver contains a built-in series-resonant trap (L5) in shunt with the antenna output receptacle. When tuned correctly, it suppresses television interference in the transmitting position. If when transmitting, the transmitter causes excess TV interference this trap may be tuned to help remove this effect.

Turn on a TV receiver that you can see from your transmitting location, and tune to one of the three lower TV channels that has a station operating in your vicinity. If you notice a "cross-hatch" or "wavy-line" pattern on the screen while you are transmitting, it will be necessary to adjust the RF trap coil slug screw, (L5) in rear of cabinet, to eliminate or minimize this interference. This will usually only be necessary when the transmitter antenna is located near the TV antenna, or that of a neighbor. This coil slug screw is located between the antenna input jack and the power input cable receptacle.

DESCRIPTION OF CONTROLS

VOLUME CONTROL AND POWER SWITCH: — Varies the sound output of the loudspeaker. Also incorporates an on-off switch at the most counterclockwise end of rotation.

TUNING CONTROL — Tuning is accomplished in the same manner as when using a standard broadcast band radio. Note: Receiver tuning has no effect on the frequency of transmission. The tuning control knob operates the illuminated dial scale and tuning condenser through a reduction drive to insure ease and accuracy in the selection of stations.

CRYSTAL SELECTOR SWITCH—Note that there are 3 positions on the crystal selector marked VFO, 1, 2. Selecting the No. 1 position will set the transmitter to the frequency of the crystal (Fundamental x 6) in the No. 1 crystal socket on the front panel, etc.

When the selector is in the VFO position, the frequency of the transmitter is controlled by the VFO plugged in the VFO socket on the front panel.

The transmitter is normally supplied with a crystal for 50.124 Mc (Fundamental frequency x 6), already installed in front panel crystal holder No. 1. Therefore the other selector positions can not be used until additional crystals are installed. All crystals must be of the fundamental type and be within .01% accuracy. The use of any other type of crystal may result in illegal (Off-frequency) operation. The transmitting frequency will be the fundamental crystal frequency stamped on the crystal case multiplied by 6.

SPOT SWITCH — When the spot switch is in the "ON" position the operator can set the receivers tuning dial to the exact frequency as transmitted. Set spot switch to "ON" position. Set meter switch to "S" position. Tune in internal generated crystal frequency for maximum gain on "S" meter. Switch is to be normally in "Off" position.

NOISE LIMITER — is used to reduce excessive noise (such as that caused by auto ignition or other disturbances) in those cases where this characteristic type noise is greater in intensity than the received signal. The use of this control may reduce slightly the overall sensitivity of the receiver.

STAND-BY SWITCH — This unit is equipped with a dual action push-push stand-by switch. To keep unit in stand-by position, push limiter control knob in. The tubes will stay heated, but the "B" power will be off. To place unit again in operation, push same knob in and the "B" power will be on.

RF PEAKING — This control is to be used after desired station has been tuned in.

When tuning, the RF Peaking knob for maximum gain it is advisable to rock both the tuning knob and the RF Peaking knob for best sensitivity.

TRANSMITTER OUTPUT TANK CONTROL — The Tank Condenser is to adjust the Transmitter for maximum output.

ANTENNA TUNE CONTROL — This adjustment is used for loading the Transmitter into the antenna.

V.F.O. POWER JACK — LOCATED IN THE REAR AND IT'S USED FOR POWERING LAFAYETTE'S HE-61, 6 METER V.F.O.

TRANSMITTING

Be sure that the proper power supply cable has been connected to the transceiver as instructed earlier, and that the unit has an adequate ground (if not mounted to a metal surface). One of the antenna systems discussed earlier should be connected. Plug the microphone into the jack provided on the extreme right of panel.

To transmit, push the button on the side of the microphone and hold it in that position. Talk directly into the microphone. Release the button to receive. The transceiver will not function as a receiver unless the button is released.

1. Turn the transceiver on, and set the tuning control to the frequency on which you desire to operate. The tuning dial will be illuminated indicating power has been applied to the unit. The "Spot" switch may be used if you desire to receive on the same frequency that is being transmitted.

2. Set **CRYSTAL SELECTOR SWITCH** to the required position for transmission on the desired frequency. Positions on Selector switch correspond to position numbers on crystal sockets on front panel.

3. Set the **METER SWITCH** to the position marked "PRF". The meter will read when the microphone button is in the transmit position. This reading will be an indication of the R.F. power delivered to the antenna.

4. Hold the microphone 4 to 8 inches away and speak in a normal tone of voice, shouting will not increase the strength of your signal. Speak clearly and slower than you would normally. As you speak into the microphone you will notice that the meter needle will "Flicker", giving an indication that the speech amplifier and modulator circuits are operating properly. Release the microphone button at the completion of your message.

5. To record the signal strength of the desired received signal set the **METER SWITCH** to the position marked "S". The meter dial is calibrated in "S" units. The tuning control can be used with the meter as a very fine tuning meter.

6. An external Variable Frequency Oscillator may be connected using the VFO socket on the front panel. Selector switch is to be in the VFO position.

ADDITIONAL CRYSTALS

The Model HE-45B is normally supplied with a crystal for 50.124 Mc already installed in the front panel crystal holder. Additional crystals for other 6 meter frequencies may be inserted. The transmitting frequency will be the fundamental crystal frequency stamped on the crystal case multiplied by 6. All crystals must be of the fundamental type and be within .01% accuracy. The use of any other type of crystal may result in illegal (Off-frequency) operation.

When replacing crystals it is suggested that the user use the nearest operating frequencies in the range of 50.15 Mc to 50.5 Mc in order to prevent TV interference.

TUBE REPLACEMENT

If tube replacement becomes necessary, all tubes can be made accessible by removing the top shell cover. Remove the two screws from the top of the front panel and then remove the two screws on each side of the top shell. Slide shell upward to remove shell from bottom plate. Do not remove any other screws from the case as a shock hazard is present if the base plate is removed. The replacement tube must have the same type number as the original. A tube location diagram can be found on the license label on the bottom of the base plate. Replace shell, side mounting screws and front panel screws.

The following information is supplied for the use of a technician in servicing the transceiver.

VOLTAGES MEASURED TO CHASSIS WITH VTVM (RCA VOLTOHMYST OR EQUIVALENT)
AND ARE POSITIVE EXCEPT WHERE NOTED.

TRANSMITTER TUNED AND LOADED, WITH NO SIGNAL INPUT TO RECEIVER

ALL MEASUREMENTS TAKEN WITH 117 VOLTS A.C. 60 CYCLE INPUT.

SYMBOL, TYPE AND FUNCTION	TYPE OF OPERATION	1	2	3	4	5	6	7	8	9
V1 - 12AB6	RECEIVE	-15V	0	FIL	FIL	160V	55V	45		
R.F. AMPLIFIER	TRANSMIT	45V	0	FIL	FIL	75	80	15		
2 - 6EA8	RECEIVE	127	-65	65	FIL	FIL	22	0	0	-3
MIXER - OSCILLATOR	TRANSMIT	125	-63	93	FIL	FIL	44	0	0	-3.2
V3 - 12AU6	RECEIVE	-15V	0	0	2VAC	200	124	7 V		
1ST IF AMPLIFIER	TRANSMIT	-32V	0	0	2VAC	220	220	1V		
4 - 6EA8	RECEIVE	45	0	90	FIL	FIL	195	15	0	-6
2ND IF AMPLIFIER / DETUNING AMP.	TRANSMIT	45	-3	163	FIL	FIL	196	35	0	-63
5 - 6CN7	RECEIVE	-05	-05	05	FIL	0	-5	58	0	
NOISE LIMITER	TRANSMIT	2	0	-05	FIL	0	-55	55	0	
6 - 6X4	RECEIVE	310	0	NC	102	124V	6VAC	0	310	0
7 - 7868	RECEIVE	310	0	NC	102	124V	6VAC	0	310	0
AUDIO OUTPUT	TRANSMIT	280	280	0	2	124V	6VAC	0	280	0
8 - 6X4	RECEIVE	280	-92	200	FIL	FIL	205	0	0	-88
CRYSTAL OSCILLATOR / DOUBLER	TRANSMIT	65	-41	145	FIL	FIL	160	0	05	-2
9 - 2E26	RECEIVE	FIL	260	-45	FIL					
R.F. POWER OUTPUT	TRANSMIT	FIL	165	-225	FIL					

2 E26 PLATE VOLTAGE MEASURED AT POINT MARKED * RECEIVE 250 V
TRANSMIT 220 V

1. Remove the (2) screws holding the front panel to the top shell.
2. Remove the (2) screws, on each side piece, holding bottom base to top shell.
3. Slide shell upward to remove top shell.
4. Remove the (4) screws, on cabinet bottom, holding the chassis to the bottom plate.
5. Remove bottom base plate.

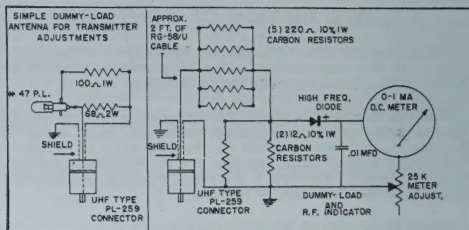
The following adjustment is to be made every time a new crystal, whose frequency is more than 0.5 Mc than the replaced crystal, is inserted into the front panel crystal holder.

When tuning up the transmitter, it is recommended that a dummy antenna be used. A simple dummy load antenna for transmitter adjustments is shown in sketch. NOTE: For those with access to the proper equipment, and knowledge of its use, the following information is provided. Maximum efficiency of power transfer to the antenna can be achieved if a 52 ohm, non-inductive load, capable of dissipating at least 15 watts, is connected to the antenna terminals. A 52 ohm load can be made by connecting a 100 watt, 50 ohm resistor in series with a 100 ohm, 100 watt resistor. The voltage drop across the 52 ohm load. Alternately, readings of output can be taken with a SWR bridge or RF voltmeter, while loading directly into the proper antenna.

1. Adjust crystal selector knob to position No. 1 or to any other position in which the 50.124 Mc crystal has been installed.
2. Insert dummy load antenna into antenna input socket.
3. Push, and hold in position, the microphone button for transmitting.
4. Adjust antenna condenser (C2) fully tight, then back out $\frac{1}{2}$ turn.

5. Adjust oscillator tripler coil slug (L1) for maximum RF power output meter reading or maximum lamp brilliance.
6. Adjust doubler coil slug (L6) for maximum RF power output meter reading or maximum lamp brilliance.
7. Adjust TANK condenser (C1) for maximum lamp brilliance or max. reading of front panel PRF meter.
8. Adjust C2 condenser for max. meter reading on front panel.
9. Adjust C1 condenser for maximum lamp brilliance or maximum reading of PRF meter.
10. After above adjustments have been made, switch the microphone button momentarily to receive position, and then back to transmit. If the lamp will not light, or the RF power output meter has a minimum reading, repeat adjustments. Use care in performing these adjustments, so that maximum oscillator drive is obtained with stability.

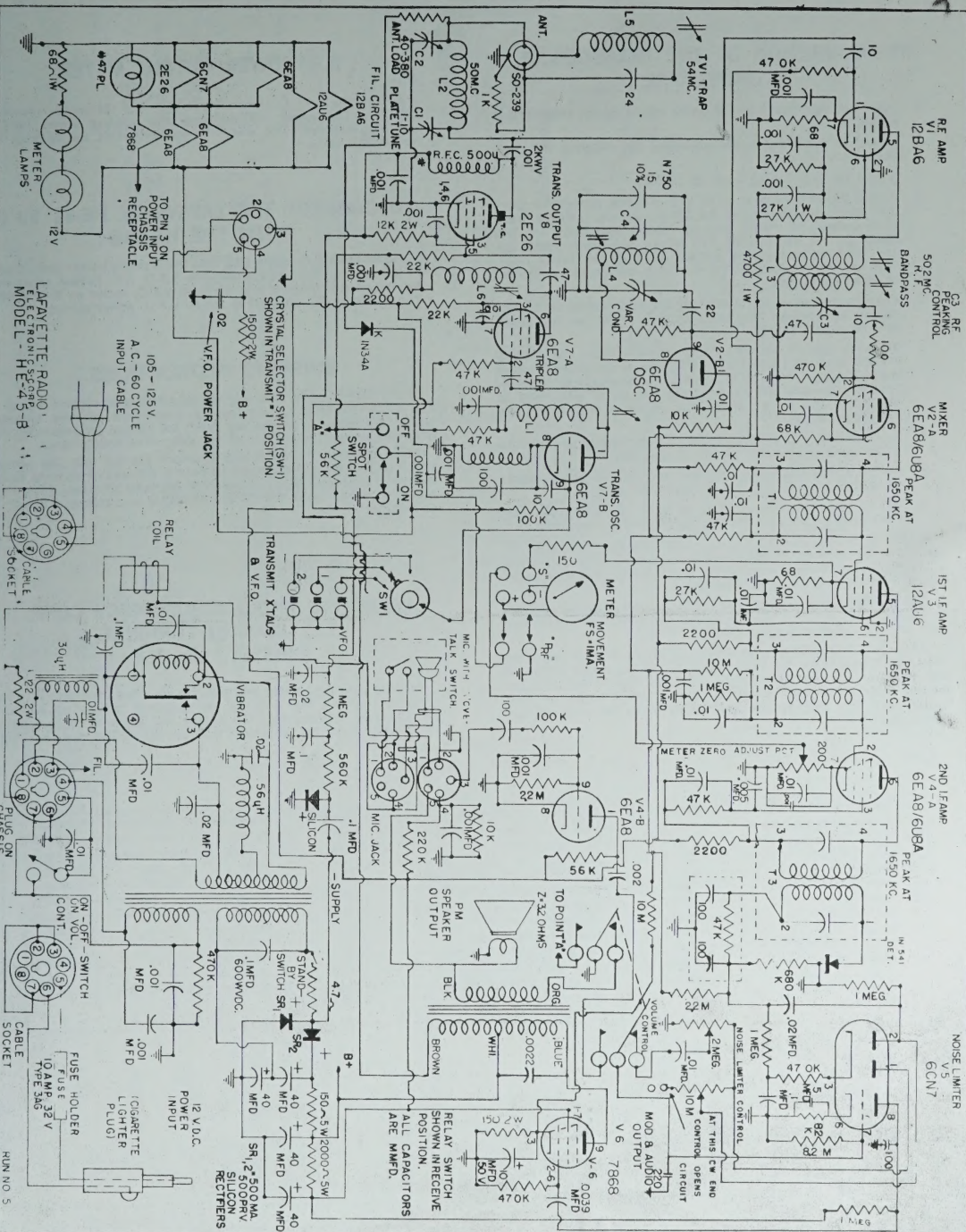
NOTE: Before making any adjustments set the crystal coil slug (L1) $\frac{1}{2}$ way in; Doubler coil slug (L6) all the way out; Tank condenser (C1) $\frac{3}{4}$ way out. Meter switch on PRF position.



1. Turn Volume control knob fully "ON". (Max. clockwise).
2. Turn Noise Limiter control fully counterclockwise.
3. Connect an A.C. voltmeter, having a 2.5 volt scale, between chassis and speaker voice coil lug near side of chassis (or Pin #5 of microphone socket on chassis).
4. Connect a signal generator to Pin #2 of the V2 Mixer tube 6EA8. Low side of generator to chassis. High side of generator, through a 0.1 Mfd condenser to pin #2.
5. Adjust signal generator to 1650 Kc and peak I.F. transformers T3-T2-T1 for maximum gain on output meter.
6. The signal generator, modulated 30% with 400 cycles, should have an output as low as possible when making these adjustments.

1. Follow paragraphs 1-2-3- under adjusting the receiver I.F. section.
2. Turn RF peaking control knob so that RF peaking variable condenser is half meshed.
3. Connect a signal generator that has the 6 meter band (50.1 to 54 Mc) spread out so that the peaking frequencies may be readily read if possible. A crystal controlled signal generator is more desirable. The signal generator is to have a 52 ohm output impedance and is to be connected to the antenna input receptacle.
4. Adjust signal generator to 52 Mc and peak the top and bottom tuning slugs of L3 for maximum gain on "S" meter or output meter.
5. The signal generator, modulated 30% with 400 cycles should have an output as low as possible when making these adjustments.

The receiver alignment is now complete. Do not change the adjustment of L2 in the input circuit as this is factory set for proper operation of the transmitter.



RE-CALIBRATION OF THE TRANSCEIVER TUNING DIAL

- Follow paragraphs 1 and 2 under adjusting the receiver I.F. section.
- Follow paragraph 3 under adjusting the receiver R.F. section.
- Adjust receiver tuning knob to 50 Mc.
- Adjust signal generator to 50 Mc. (Crystal controlled more desirable). Adjust receiver oscillator coil slug (L4) for maximum output on meter. You will notice that there are two peaks on this adjustment. The image frequency is the upper or lower peak. The correct peak is the lower peak. This can be checked by the use of a calibrated wavemeter or signal generator.
- Adjust signal generator and receiving tuning knob to 53 Mc. Adjust Bandsread trimmer condenser (C4) for maximum gain on output meter.
- Re-check the 50 Mc calibration. If calibration has slightly shifted re-adjust L4 coil slug and trimmer capacitor C4 until the calibration points of tuning dial are approximately equal. This can be checked by adjusting the signal generator to 50-53 Mc and noting where the signal comes in on the transceiver's dial.
- It is necessary in making the R.F. adjustments to keep the signal generator output as low as possible.
- Re-mount the transceiver chassis into cabinet using reverse procedure of removing the chassis from cabinet.
- Before mounting the top cabinet shell check the dial calibration. If calibration has slightly shifted go over step 6.

NOTE: If no A.C. output meter is available the receiver's "S" meter can be used as an output meter. Set meter slide switch to "S" position and keep the generator signal input as low as possible to obtain 1/2 meter scale reading.

NOTE: When steps 4 to 6 are made, the RF Peaking variable condenser (C3) is to be rocked at the same time for maximum gain on "S" meter or output meter.

If the 1st I.F. amplifier tube V3-12AU6 or the 2nd I.F. amplifier tube V4-A 6U8A/6EA8 has been replaced and the meter pointer is not on zero, with no signal input, re-adjust the meter zero pot located beneath vibrator socket, on back chassis apron for electrical zero. The mechanical meter zero is to be adjusted with transceiver off.

R.F. POWER OUTPUT METER

Switch the unit to transmit position and the meter switch to "PRF". The meter will indicate the relative power feeding into the antenna. The meter is an indication for peaking the transmitter coils.

TO CONNECT THE LAFAYETTE HE-61 V.F.O. WITH THE HE-45B

Insert the V.F.O. cable plug into the 5 prong power jack located in the rear of the transceiver. The V.F.O. R.F. output cable with two pin plug, is plugged into the front V.F.O. socket on the HE-45B. The HI lead (with red dot) to the HI V.F.O. power socket.

SHIPPING INSTRUCTIONS

If the unit must be returned for adjustment or service, attach a tag to the unit bearing your name and complete address. Include, either in a letter or on the tag itself, the reason for returning the unit and a brief description of the difficulties encountered.

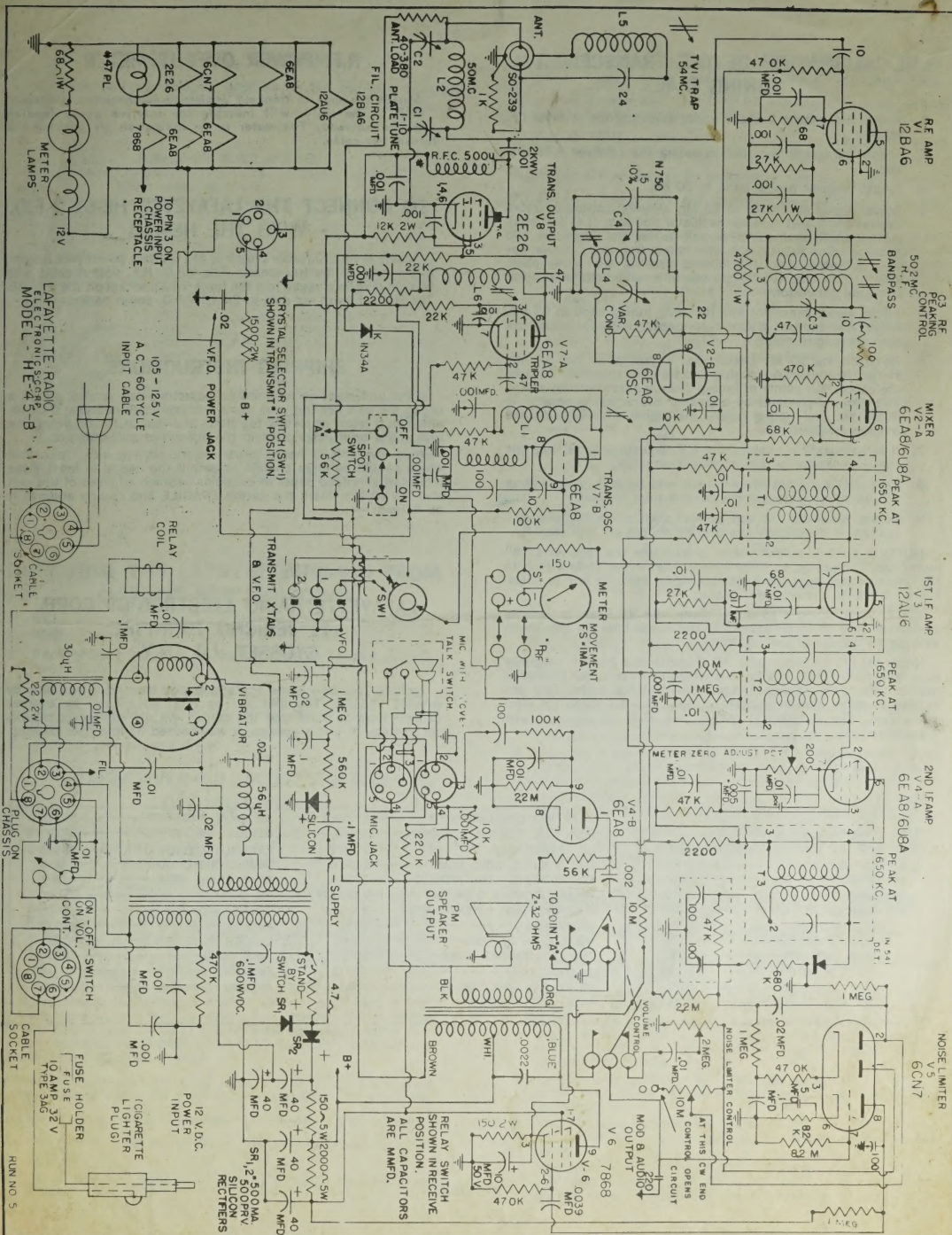
Wrap the unit in heavy paper before placing into the carton which should be large enough to permit the use of at least three inches of shredded paper or excelsior between all sides of the unit and the carton. Mark the carton FRAGILE and clearly address it as follows:—

TO:

LAFAYETTE RADIO ELECTRONICS CORP.
111 JERICHO TURNPIKE
SYOSSET, L.I., N.Y.

Include your own name and address on the carton and ship by prepaid express. The unit will be returned to you by express collect. Bear in mind that the carrier will disclaim responsibility for damage if, in his opinion, it was caused by improper packing.

T5- POWER TRANS	-----T1022-1	RCVR VAR CONDENSER	-----V235A-5	SELENIUM RECTIFIER	-----SR883-1
T4- OUTPUT & MOD TRANS	-----T1017-2	C4-RCVR VAR TRIMMER COND.	-----TC24H-1	SILICON RECTIFIER	-----SR846-3
L3- RCVR RF BANDPASS TRANS	-----T1088-2	TI-I.F. TRANSFORMER	-----I110-5	CRYSTAL SELECTOR SWITCH	-----RS849-5
L4- RCVR OSC COIL	-----C189-4	ELECTROLYTIC COND. (CAN)	-----E237-1	5000 U. CHOKE COIL	-----C185-12
L1- TRANS TRIPLER COIL	-----C190A-7	ELECTROLYTIC COND. (STRAP)	-----E238-1	RCVR- TRANS. RELAY	-----R718-2
L6- TRANS DOUBLER COIL	-----C180-11	VOLUME CONTROL & SWITCH	-----V332A-2	PM SPEAKER	-----S719-4
L2- TRANS. OUTPUT COIL	-----C195-2	"S" METER ZERO POTENTIOMETER	-----P325-3	TUNING KNOB	-----K4005-11
DIAL SCALE	-----DS620-1	MICROPHONE	-----M868-1	KNOB	-----K4005-12
1/2 WATT RESISTOR	-----3029	MOLDED PAPER COND.	-----C240	LIGHTER PLUG CABLE	-----PC525-2
1WATT RESISTOR	-----3030	TUBULAR CERAMIC COND.	-----2012-C	TANK COND.	-----C250B-1
5 WATT RESISTOR	-----W328	L5-T.V. TRAP COIL	-----C191-2	VIBRATOR	-----CD8400
2 WATT RESISTOR	-----B109	RF PEAKING VAR COND.	-----V253A-1	ANTENNA TRIMMER	-----AT-251-1
"S" METER I.M.A D.C.	-----3036	NOISE LIMITER CONTROL	-----V343A-1		
		REPLACEMENT PARTS	HE 45-B		



RE-CALIBRATION OF THE TRANSCEIVER TUNING DIAL

1. Follow paragraphs 1 and 2 under adjusting the receiver I.F. section.
2. Follow paragraph 3 under adjusting the receiver R.F. section.
3. Adjust receiver tuning knob to 50 Mc.
4. Adjust signal generator to 50 Mc. (Crystal controlled more desirable). Adjust receiver oscillator coil slug (L4) for maximum output on meter. You will notice that there are two peaks on this adjustment. The image frequency is the upper or lower peak. The correct peak is the lower peak. This can be checked by the use of a calibrated wavemeter or signal generator.
5. Adjust signal generator and receiving tuning knob to 53 Mc. Adjust Bandsread trimmer condenser (C4) for maximum gain on output meter.
6. Re-check the 50 Mc calibration. If calibration has slightly shifted re-adjust L4 coil slug and trimmer capacitor C4 until the calibration points of tuning dial are approximately equal. This can be checked by adjusting the signal generator to 50-53 Mc and noting where the signal comes in on the transceiver's dial.
7. It is necessary in making the R.F. adjustments to keep the signal generator output as low as possible.
8. Re-mount the transceiver chassis into cabinet using reverse procedure of removing the chassis from cabinet.
9. Before mounting the top cabinet shell check the dial calibration. If calibration has slightly shifted go over step 6.

NOTE: If no A.C. output meter is available the receiver's "S" meter can be used as an output meter. Set meter slide switch to "S" position and keep the generator signal input as low as possible to obtain 1/2 meter scale reading.

NOTE: When steps 4 to 6 are made, the RF Peaking variable condenser (C3) is to be rocked at the same time for maximum gain on "S" meter or output meter.

If the 1st I.F. amplifier tube V3-12AU6 or the 2nd I.F. amplifier tube V4-A 6U8A/6EA8 has been replaced and the meter pointer is not on zero, with no signal input, re-adjust the meter zero pot located beneath vibrator socket, on back chassis apron for electrical zero. The mechanical meter zero is to be adjusted with transceiver off.

R.F. POWER OUTPUT METER

Switch the unit to transmit position and the meter switch to "PRF". The meter will indicate the relative power feeding into the antenna. The meter is an indication for peaking the transmitter coils.

TO CONNECT THE LAFAYETTE HE-61 V.F.O. WITH THE HE-45B

Insert the V.F.O. cable plug into the 5 prong power jack located in the rear of the transceiver. The V.F.O. R.F. output cable with two pin plug, is plugged into the front V.F.O. socket on the HE-45B. The HI lead (with red dot) to the HI V.F.O. power socket.

SHIPPING INSTRUCTIONS

If the unit must be returned for adjustment or service, attach a tag to the unit bearing your name and complete address. Include, either in a letter or on the tag itself, the reason for returning the unit and a brief description of the difficulties encountered.

Wrap the unit in heavy paper before placing into the carton which should be large enough to permit the use of at least three inches of shredded paper or excelsior between all sides of the unit and the carton. Mark the carton FRAGILE and clearly address it as follows:—

TO:

LAFAYETTE RADIO ELECTRONICS CORP.
111 JERICHO TURNPIKE
SYOSSET, L.I., N.Y.

Include your own name and address on the carton and ship by prepaid express. The unit will be returned to you by express collect. Bear in mind that the carrier will disclaim responsibility for damage if, in his opinion, it was caused by improper packing.

T5— POWER TRANS ————T1022-1	RCVR. VAR. CONDENSER ————V235A-5	SELENIUM RECTIFIER ————SR883-1
T4— OUTPUT & MOD. TRANS ————T1017-2	C4— RCVR. VAR. TRIMMER COND. ————TC241-1	SILICON RECTIFIER ————SR846-3
L3— RCVR. R.F. BANDPASS TRANS ————T1088-2	T1—I.F. TRANSFORMER ————I110-5	CRYSTAL SELECTOR SWITCH ————RS849-5
L4— RCVR. OSC. COIL ————O109-4	ELECTROLYTIC COND. (CAN) ————E237-1	5000 μ CHOKE COIL ————C185-12
L1— TRANS. TRIPLER COIL ————C190A-7	ELECTROLYTIC COND. (STRAP) ————E238-1	RCVR.— TRANS. RELAY ————R718-2
L6— TRANS. DOUBLER COIL ————C180-II	VOLUME CONTROL & SWITCH ————V332A-2	PM SPEAKER ————S719-4
L2— TRANS. OUTPUT COIL ————C195-2	"S" METER ZERO POTENTIOMETER ————P325-3	TUNING KNOB ————K4005-II
DIAL SCALE ————DS620-1	MICROPHONE ————M868-1	KNOB ————K4005-12
1/2 WATT RESISTOR ————3029	MOLDED PAPER COND. ————C240	LIGHTER PLUG CABLE ————PC525-2
1WATT RESISTOR ————3030	TUBULAR CERAMIC COND. ————2012-C	TANK COND. ————C250B-1
5 WATT RESISTOR ————W328	L5—T.V. TRAP COIL ————C191-2	VIBRATOR ————CD8400
2 WATT RESISTOR ————8109	RF PEAKING VAR. COND. ————V253A-1	ANTENNA TRIMMER ————AT-251-1
"S" METER I.M.A. D.C. ————3036	NOISE LIMITER CONTROL ————V343A-1	
	REPLACEMENT PARTS HE 45-B	

TECHNICAL SECTION

The following information is supplied for the use of a technician in servicing the transceiver.

TYPICAL TUBE SOCKET VOLTAGES

VOLTAGES MEASURED TO CHASSIS WITH VTVM (RCA VOLTOHMYST OR EQUIVALENT) AND ARE POSITIVE EXCEPT WHERE NOTED.

TRANSMITTER TUNED AND LOADED, WITH NO SIGNAL INPUT TO RECEIVER.

ALL MEASUREMENTS TAKEN WITH 117 VOLTS A.C. 60 CYCLE INPUT.

SYMBOL, TUBE TYPE AND FUNCTION	OPERATION	PIN NUMBERS								
		1	2	3	4	5	6	7	8	9
V1 - 12BA6 R.F. AMPLIFIER	RECEIVE	-15V	0	FIL	FIL	160V	55V	.45		
	TRANSMIT	.45V	0	FIL	FIL	175	80	.15		
V2 - 6EA8 MIXER - OSCILLATOR	RECEIVE	127	-65	65	FIL	FIL	22	0	0	-3
	TRANSMIT	125	-3.8	93	FIL	FIL	44	0	0	-3.2
V3 - 12AU6 1ST I.F. AMPLIFIER	RECEIVE	-15V	0	0	12VAC	200	124	7V		
	TRANSMIT	-32V	0	0	12VAC	220	220	1V		
V4 - 6EA8 2ND I.F. AMPLIFIER / MICROPHONE AMP.	RECEIVE	.45	0	90	FIL	FIL	195	15	0	-6
	TRANSMIT	.45	-3	163	FIL	FIL	196	35	0	-63
V5 - 6CN7 NOISE LIMITER A.F. AMPLIFIER	RECEIVE	-05	.05	.05	FIL	FIL	0	-5	58	0
	TRANSMIT	.2	0	-.05	FIL	FIL	0	-.55	55	0
V6 - 7668 AUDIO OUTPUT AND MODULATOR	RECEIVE	310	0	NC	102	12VAC	5VAC	0	310	0
	TRANSMIT	280	0	92	12VAC	5VAC	0	280	0	270
V7 - 6EA8 CRYSTAL OSCILLATOR DOUBLER / DOUBLER	RECEIVE	200	-92	200	FIL	FIL	205	0	0	-88
	TRANSMIT	65	-4.1	145	FIL	FIL	160	0	0	-2
V8 - 2E25 R.F. POWER OUTPUT	RECEIVE	FIL	260		-45	FIL				
	TRANSMIT	FIL	165		-225	FIL				

2E25 PLATE VOLTAGE MEASURED AT POINT MARKED * RECEIVE 250 V
TRANSMIT 220 V

REMOVING THE LAFAYETTE HE-45B FROM CABINET FOR SERVICING

1. Remove the (2) screws holding the front panel to the top shell.
2. Remove the (2) screws, on each side piece, holding bottom base to top shell.
3. Slide shell upward to remove top shell.
4. Remove the (4) screws, on cabinet bottom, holding the chassis to the bottom plate.
5. Remove bottom base plate.

TRANSCIVER ADJUSTMENTS AND CALIBRATION

The following adjustment is to be made every time a new crystal, whose frequency is more than 0.5 Mc than the replaced crystal, is inserted into the front panel crystal holder.

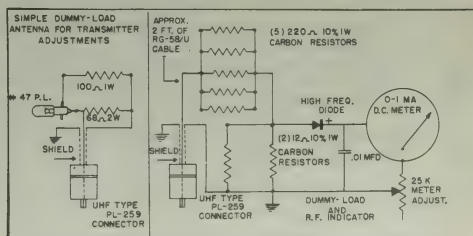
ADJUSTING THE TRANSMITTER

When tuning up the transmitter, it is recommended that a dummy antenna be used. A simple dummy load antenna for transmitter adjustments is shown in sketch. NOTE: For those with access to the proper equipment, and knowledge of its use, the following information is provided. Maximum efficiency of power transfer to the antenna can be achieved if a 52 ohm, non-inductive load, capable of dissipating at least 15 watts, is connected to the antenna input socket. With a suitable R.F. voltmeter measure the voltage drop across the 52 ohm load. Alternately readings of output can be taken with a SWR bridge or RF voltmeter, while loading directly into the proper antenna.

1. Adjust crystal selector knob to position No. 1 or to any other position in which the 50.124 Mc crystal has been installed.
2. Insert dummy load antenna into antenna input socket.
3. Push, and hold in position, the microphone button for transmitting.
4. Adjust antenna condenser (C2) fully tight, then back out 1/2 turn.

5. Adjust oscillator tripler coil slug (L1) for maximum RF power output meter reading or maximum lamp brilliance.
6. Adjust doubler coil slug (L6) for maximum RF power output meter reading or maximum lamp brilliance.
7. Adjust TANK condenser (C1) for maximum lamp brilliance or max. reading of front panel PRF meter.
8. Adjust C2 condenser for max. meter reading on front panel.
9. Adjust C1 condenser for maximum lamp brilliance or maximum reading of PRF meter.
10. After above adjustments have been made, switch the microphone button momentarily to receive position, and then back to transmit. If the lamp will not light, or the RF power output meter has a minimum reading, repeat adjustments. Use care in performing these adjustments, so that maximum oscillator drive is obtained with stability.

NOTE: Before making any adjustments set the crystal coil slug (L1) 1/2 way in; Doubler coil slug (L6) all the way out; Tank condenser (C1) 1/4 way out. Meter switch on PRF position.



ADJUSTING THE RECEIVER I.F. SECTION

1. Turn Volume control knob fully "ON". (Max. clockwise).
2. Turn Noise Limiter control fully counterclockwise.
3. Connect an A.C. voltmeter, having a 2.5 volt scale, between chassis and speaker voice coil lug near side of chassis (or Pin #5 of microphone socket on chassis).
4. Connect a signal generator to Pin #2 of the V2 Mixer tube 6EA8. Low side of generator to chassis. High side of generator, through a 0.1 Mfd condenser to pin #2.
5. Adjust signal generator to 1650 Kc and peak I.F. transformers T3-T2-T1 for maximum gain on output meter.
6. The signal generator, modulated 30% with 400 cycles, should have an output as low as possible when making these adjustments.

ADJUSTING THE RECEIVER R.F. SECTION

1. Follow paragraphs 1-2-3. under adjusting the receiver I.F. section.
2. Turn RF peaking control knob so that RF peaking variable condenser is half meshed.
3. Connect a signal generator that has the 6 meter band (50.1 to 54 Mc) spread out so that the peaking frequencies may be directly read. If possible, a crystal controlled signal generator is more desirable. The signal generator is to have a 52 ohm output impedance and is to be connected to the antenna input receptacle.
4. Adjust signal generator to 52 Mc and peak the top and bottom tuning slugs of L3 for maximum gain on "S" meter or output meter.
5. The signal generator, modulated 30% with 400 cycles should have an output as low as possible when making these adjustments.

The receiver alignment is now complete. Do not change the adjustment of L2 in the input circuit as this is factory set for proper operation of the transmitter.

fully tight then back out a $\frac{1}{2}$ turn. Adjust antenna tank condenser (C1) for max. reading of the PRF meter or maximum brilliance of the lamp. Re-adjust C2 condenser for max reading on the "PRF" meter. Then re-adjust C1 condenser for maximum lamp brilliance or max reading of meter.

T.V. INTERFERENCE TRAP

This transceiver contains a built-in series-resonant trap (L5) in shunt with the antenna output receptacle. When tuned correctly, it suppresses television interference in the transmitting position. If when transmitting, the transmitter causes excess TV interference this trap may be tuned to help remove this effect.

Turn on a TV receiver that you can see from your transmitting location, and tune to one of the three lower TV channels that has a station operating in your vicinity. If you notice a "cross-hatch" or "wavy-line" pattern on the screen while you are transmitting, it will be necessary to adjust the RF trap coil slug screw, (L5) in rear of cabinet, to eliminate or minimize this interference. This will usually only be necessary when the transmitter antenna is located near the TV antenna, or that of a neighbor. This coil slug screw is located between the antenna input jack and the power input cable receptacle.

DESCRIPTION OF CONTROLS

VOLUME CONTROL AND POWER SWITCH: — Varies the sound output of the loudspeaker. Also incorporates an on-off switch at the most counterclockwise end of rotation.

TUNING CONTROL — Tuning is accomplished in the same manner as when using a standard broadcast band radio. Note: Receiver tuning has no effect on the frequency of transmission. The tuning control knob operates the illuminated dial scale and tuning condenser through a reduction drive to insure ease and accuracy in the selection of stations.

CRYSTAL SELECTOR SWITCH—Note that there are 3 positions on the crystal selector marked VFO, 1, 2. Selecting the No. 1 position will set the transmitter to the frequency of the crystal (Fundamental x 6) in the No. 1 crystal socket on the front panel, etc.

When the selector is in the VFO position, the frequency of the transmitter is controlled by the VFO plugged in the VFO socket on the front panel.

The transmitter is normally supplied with a crystal for 50.124 Mc (Fundamental frequency x 6), already installed in front panel crystal holder No. 1. Therefore the other selector positions can not be used until additional crystals are installed. All crystals must be of the fundamental type and be within .01% accuracy. The use of any other type of crystal may result in illegal (Off-frequency) operation. The transmitting frequency will be the fundamental crystal frequency stamped on the crystal case multiplied by 6.

SPOT SWITCH — When the spot switch is in the "ON" position the operator can set the receivers tuning dial to the exact frequency as transmitted. Set spot switch to "ON" position. Set meter switch to "S" position. Tune in internal generated crystal frequency for maximum gain on "S" meter. Switch is to be normally in "OFF" position.

NOISE LIMITER — is used to reduce excessive noise (such as that caused by auto ignition or other disturbances) in those cases where this characteristic type noise is greater in intensity than the received signal. The use of this control may reduce slightly the overall sensitivity of the receiver.

STAND-BY SWITCH — This unit is equipped with a dual action push-push stand-by switch. To keep unit in stand-by position, push limiter control knob in. The tubes will stay heated, but the "B" power will be off. To place unit again in operation, push same knob in and the "B" power will be on.

RF PEAKING — This control is to be used after desired station has been tuned in.

When tuning, the RF Peaking knob for maximum gain it is advisable to rock both the tuning knob and the RF Peaking knob for best sensitivity.

TRANSMITTER OUTPUT TANK CONTROL — The tank Condenser is to adjust the Transmitter for maximum output.

ANTENNA TUNE CONTROL — This adjustment is used for loading the Transmitter into the antenna.

V.F.O. POWER JACK — LOCATED IN THE REAR AND IT'S USED FOR POWERING LAFAYETTE'S HE-61, 6 METER V.F.O.

TRANSMITTING

Be sure that the proper power supply cable has been connected to the transceiver as instructed earlier, and that the unit has an adequate ground (if not mounted to a metal surface). One of the antenna systems discussed earlier should be connected. Plug the microphone into the jack provided on the extreme right of panel.

To transmit, push the button on the side of the microphone and hold it in that position. Talk directly into the microphone. Release the button to receive. The transceiver will not function as a receiver unless the button is released.

1. Turn the transceiver on, and set the tuning control to the frequency on which you desire to operate. The tuning dial will be illuminated indicating power has been applied to the unit. The "Spot" switch may be used if you desire to receive on the same frequency that is being transmitted.

2. Set CRYSTAL SELECTOR SWITCH to the required position for transmission on the desired frequency. Positions on Selector switch correspond to position numbers on crystal sockets on front panel.

3. Set the METER SWITCH to the position marked "PRF". The meter will read when the microphone button is in the transmit position. This reading will be an indication of the R.F. power delivered to the antenna.

4. Hold the microphone 4 to 8 inches away and speak in a normal tone of voice, shouting will not increase the strength of your signal. Speak clearly and slower than you would normally. As you speak into the microphone you will notice that the meter needle will "Flicker", giving an indication that the speech amplifier and modulator circuits are operating properly. Release the microphone button at the completion of your message.

5. To record the signal strength of the desired received signal set the METER switch to the position marked "S". The meter dial is calibrated in "S" units. The tuning control can be used with the meter as a very fine tuning meter.

6. An external Variable Frequency Oscillator may be connected using the VFO socket on the front panel. Selector switch is to be in the VFO position.

ADDITIONAL CRYSTALS

The Model HE-45B is normally supplied with a crystal for 50.124 Mc already installed in the front panel crystal holder. Additional crystals for other 6 meter frequencies may be inserted. The transmitting frequency will be the fundamental crystal frequency stamped on the crystal case multiplied by 6. All crystals must be of the fundamental type and be within .01% accuracy. The use of any other type of crystal may result in illegal (Off-frequency) operation.

When replacing crystals it is suggested that the user use the nearest operating frequencies in the range of 50.15 Mc to 50.5 Mc in order to prevent TV interference.

TUBE REPLACEMENT

If tube replacement becomes necessary, all tubes can be made accessible by removing the top shell cover. Remove the two screws from the top of the front panel and then remove the two screws on each side of the top shell. Slide shell upward to remove shell from bottom plate. Do not remove any other screws from the case as a shock hazard is present if the base plate is removed. The replacement tube must have the same type number as the original. A tube location diagram can be found on the license label on the bottom of the base plate. Replace shell, side mounting screws and front panel screws.

ANTENNA INSTALLATION

The most important single factor determining optimum transmission is the antenna. The antenna chosen should be selected for each transceiver on the basis of the application involved.

FIXED ANTENNA INSTALLATION

For short range communication, an inexpensive base load type of antenna or spiral whip antenna will be adequate. An antenna of the "ground plane" type will provide greater, more reliable coverage. Both of these types are essentially non-directional and are ideal for applications involving fixed-to-mobile operation.

The directional "beam" type of antenna with ant. rotator may be used to extend the range of the Transceiver and will provide reliable communication over an unusually long range or under adverse weather conditions. Because of their directional properties these antennas are ideal for point-to-point communication, that is, from fixed station to another. A good 4 or 5 element beam is recommended.

The range of the transceiver also has a direct bearing on the height of the antenna used. Regardless of the type chosen, always locate the antenna as high as possible. It is important therefore, to choose a location for the transceiver that is favorable to your antenna location. A long lead-in cable will introduce a certain amount of power loss and should be avoided where possible unless the antenna location justifies its use. Up to 25 feet of cable lead-in may be used if it permits a favorable antenna location.

Wherever possible, use a good water pipe ground. In most cases this will provide greatly improved operation.

MOBILE ANTENNA INSTALLATION

The type of antenna best suited for mobile service is a vertically polarized whip antenna. In any mobile installation (Cars, trucks, boats, etc.), an antenna system that is non-directional has to be used. Other factors likely to offset performance are lack of a good earth ground and ignition interference. However, the base-load type whip antenna will normally provide good results for short-range communications. Greater range and more reliable operation can be obtained with a full quarter-wave vertical whip antenna. Both of these types of antennas use the metal body of the vehicle as a "ground plane". If the transceiver is not mounted to any metal surface, it will be necessary to run a separate ground wire from the unit to a good metal ground in the vehicle. If installed in a boat the transceiver will not operate at maximum efficiency without a ground plate, unless your vessel has a steel hull. However, before installing the transceiver, consult a qualified marine technician regarding an adequate grounding system. The new type hi-gain horizontally polarized Halo antenna for 6 meters or a coaxial antenna is also recommended for mobile operation.

ANTENNA CONNECTIONS

The antenna lead-in cable, RG-58/U, should be terminated with a UHF type PL-259 connector. The receptacle, SO-239, located on the transceiver accepts this type of connector.

The LAFAYETTE Model HE-748WX Halo type antenna or the cowl mount universal 6 Meter Mobile antenna, Model HE-801WX may be connected directly to the transceiver.

IGNITION INTERFERENCE

Engine ignition interference in a car or truck should not present a serious problem. The suppression carried out on vehicles equipped with a standard broadcast radio will normally suffice. However, if an ignition interference problem is present, any skilled auto radio repairman should be able to correct it for you.

Electrical noise from engines and other electrical equipment aboard a boat or vessel can render your transceiver useless. The worst offender will be the ignition system of gasoline engine pow-

ered boats. Generators on both gasoline and diesel engines, auxiliary generators, electric motors on refrigerators, bilge pumps, fans, etc., must be filtered for quiet radio reception.

Unfortunately, there is no hard and fast rule for the elimination of noise. It is best to attack the problem systematically. The ignition system can be filtered by the use of a "spark shield" made to fit most common gasoline marine engines. These shields are easily installed and can be removed for spark plug and point servicing in less than a minute.

Auxiliary generators are quieted down by condenser installations. Condensers of the highest quality, in metal cans, should be used. We recommend that a capacity of 1.0 mfd be used. These are of greater capacity than the condensers normally used in automobile radio installations. The same condensers can be used to filter the other motors. Condensers are installed at the generator armature terminal or, in extreme cases, directly on each brush holder. The metal can is connected to the generator frame. Never connect a condenser to the field terminal of a generator.

The voltage regulator on the larger generators is frequently a source of troublesome noise. Before attempting any filtering on the regulator, have the unit cleaned and adjusted by an expert. If noise is still present, install condensers on the armature terminal of the regulator. Again, do not put a condenser on the field terminal.

Another, more infrequent source of noise is caused by the rotation of the propeller shaft in its various bearings. This rotation causes static electricity discharge. If noise is present when the vessel or boat is underway but goes away when you throw the engine out of gear, you most probably have "shaft noise". This noise can usually be eliminated by installing phosphor bronze "fingers" in such a way as to allow wiping contact with the shaft. The finger is then connected to the engine block with a heavy wire.

Diesel engines have no ignition system and therefore need no shields. The generators must be filtered just as they are for gasoline engines.

Other electrical accessories such as fans, bilge pumps, electric toilets, fresh water system motors, etc., are also a possible source of noise. These units can be noise suppressed by means of condensers.

MOBILE INSTALLATION OF TRANSCEIVER

Before installing the transceiver in a car, truck, boat, etc., be sure to choose a location which is convenient to the operating controls, and will not interfere with the normal functions of the driver. The transceiver may be mounted to the underside of the instrument panel or dashboard of a car, truck, etc., by means of the carrying handle, that is supplied with the transceiver. Remove the two rubber bumpers from the handle to provide mounting holes. Two self threading screws are provided for this. If additional back support is required, provision has been made for the use of a perforated steel strap. Cut and bend the perforated strap to the desired shape, attaching one end to the firewall and the other end to the self threading screw projecting from chassis rear. The 12V D.C. power input cable is terminated with a plug which may be inserted directly into the cigarette lighter socket on a car or truck. A 10 Amp fuse is incorporated as part of this cable. In a more permanent installation the plug should be removed and the cable connected to the main battery source. A convenient place to make this connection would be the ignition switch. In this manner the power input to the transceiver would be controlled by the position of the ignition key. This will prevent unauthorized persons from using the transceiver and also prevent the transceiver from being left on. It is imperative that the "hot" or center lead of this plug is connected to the ignition switch. If this wire is reversed, the fuse in the vehicle will blow.

MAXIMUM POWER TRANSFER TO ANTENNA

With antenna disconnected, insert the recommended dummy antenna, see sketch, into the antenna receptacle. Set transceiver to the transmitting position. Set METER switch to the PRF position. With a combination coil slug alignment tool adjust antenna TUNE condenser (C2), see license label for location,

LAFAYETTE

6 METER AMATEUR BAND TRANSCEIVER

MODEL HE-45B

OPERATING AND INSTALLATION INSTRUCTIONS

SPECIFICATIONS

RECEIVER

Superheterodyne receiver covering the entire 6 meter (50 to 54 Mc) amateur radio service. Built-in noise limiter control with improved full wave automatic and adjustable noise limiter and full AVC. Illuminated channel tuning dial with planetary vernier tuning. An "S" meter calibrated in S units allows measurements of incoming signal strength. The meter is wired with a switch to enable monitoring of final transmitter amplifier wattage.

SENSITIVITY: 1 microvolt.
SELECTIVITY: 3 KC at 6db down.
IMAGE REJECTION: 45 db.
I.F. FREQUENCY: 1650 KC.
NOISE GATE LIMITER: Adjustable type.
AUDIO OUTPUT: 3 Watt, 3½ Alnico V Speaker.

TRANSMITTER

POWER: Power input of 15 watts to the final Straight-through class C 2E26 RF amplifier.
FREQUENCY: 3 switch selected transmit positions. Supplied with crystal for one frequency. Widely tuned for full efficiency on the entire 6 meter band.
MICROPHONE: Hand held ceramic microphone with push to talk switch; Position one—microphone in receive position; Position two—microphone in push to talk position. Spring release switch.
ANTENNA MATCHING: 30 to 100 ohms.

CONTROLS

RF PEAKING CONTROL
VOLUME ON-OFF
PLANETARY TUNING
NOISE LIMITER CONTROL Adjustable type including stand-by switch.
CRYSTAL SELECTOR: 2 crystal controlled fixed transmitting frequencies plus a position for an external V.F.O.
RF METER INDICATOR: 2 position switch controlled. Position "PRF" - reads antenna feed voltage. Position "S" indicates received signal strength. Zero adjustment provided.
SPOT SWITCH: Crystal calibrator to check calibration of receivers frequency dial.

Operates on 117 VAC and 12 volts DC, with proper supplied cables. Battery operated cable internally fused.

INPUT RATING 117 Volts AC 60 cycles
80 Watts Receive
100 Watts Transmit
12.6 Volts D.C.
6.5 Amps Transmit
5 Amps Receive

SIZE: 5½" H x 12½" W x 8" D.

TANK CONTROL: Tank condenser to adjust the transmitter for maximum output.

ANTENNA TUNE CONTROL: Used for loading the transmitter into the antenna.

The Lafayette Model HE-45B transceiver is a combination transmitter and receiver designed for use in the 6 meter (50.1 to 54 Mc) amateur radio service. Designed to meet the Federal Communications Commission (FCC) requirements, the unit will provide economical and reliable radio communication in its intended application if installed and operated in accordance with instructions contained herein.

The transmitter may be operated on any frequency in the 6 meter amateur phone band (50.1 to 54 Mc). Provision has been made for front panel insertion of 2 crystals into the unit, any one of which may be selected by means of a 3 position selector switch. Crystals covering any frequency within the 6 meter amateur band can very easily be inserted into the unit. A-VFO may be inserted into a socket on the front panel, selected by the selector switch. Crystal controlled and plate modulated, the transmitter delivers a power input of 15 Watts to the final RF amplifier.

The receiver utilizes a sensitive superheterodyne circuit with 3 I.F. dual tuned transformers and incorporates a built-in noise limiter circuit with full wave automatic series noise limiting and full AVC. An adjustable tuned RF Bandpass stage precedes the detector for added sensitivity and selectivity, and to keep RF radiation to a minimum. The receiver tunes the entire 6 meter band. The receiver also incorporates an "S" meter for recording the signal strength of the desired signal. A spotting switch is incorporated which permits the operator to set the receivers tuning dial to the exact frequency upon which you are transmitting. A variable "Pi" network is incorporated that permits matching to any type of antenna.

POWER SUPPLIES

The HE-45B may be operated from a 117 volt 60 cycle AC source or from a 12 volt DC battery source.

117V 60 Cycle AC Source: An AC line cord, terminated at one end with a normal AC plug and at the other with an 8-pin socket, is supplied with the Transceiver. The 8-pin socket should be connected to the matching plug on the transceiver before inserting the AC plug into the wall outlet.

12V DC Source: The battery cable supplied is terminated at one end with a 8-pin socket and at the other end with an external in-line fuse holder terminating into a cigarette lighter plug. The 8-pin socket should be connected to the matching plug on the transceiver. It does not matter which polarity of the battery is grounded since inserting the other end of the cable into the lighter receptacle automatically connects the cable to the "Hot" (Ungrounded) terminal of the battery.

Sheep®
UPC 10330
No. 153L
HASTINGS, MN



